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RAISING AND FATTENING BEEF CALVES IN ALABAMA.[1]

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STATEMENT OF FORMER WORK.

During the years 1906, 1907, and 1908 the Bureau of Animal Industry, working in cooperation with the Alabama Agricultural Experiment Station, conducted experiments in cooperation with Mr. J. S. Kernachan, of Sheffield, Ala., to obtain definite information regarding the cost of raising grade steers to the feed lot period under average southern conditions. (See Bulletin 131 of the bureau, or 150, Alabama Experiment Station.) The animals used in the Kernachan work were a herd of grade Aberdeen-Angus cows, headed by two pure-bred Aberdeen-Angus bulls. During the summer months the herd grazed upon a good pasture; no feed was given in addition to the pasture. This pasture was made up principally of white clover, Japan clover (lespedeza), several varieties of native grasses, and some Bermuda. This afforded the animals abundant pasture for about seven months of the year. During the winter all of the cattle, young and old, had the run of the range, which consisted of old corn and cotton fields, with some cane along the river and creek banks. In addition to the winter range, hay and cotton seed were fed, so that when spring came the cattle were in reasonably good flesh. The young stock made gains during the winter, but the cows and older animals usually lost in weight during the latter part of the winter. These cows and calves were allowed to become infested with the cattle tick, but when they became badly infested they were greased on those parts of the body where ticks were most numerous. The presence of the cattle tick, together with an outbreak of tuberculosis, caused the steers to be produced at an abnormally high figure, as the ticks no doubt materially retarded the growth of the steers and the

[1] The experiments reported in this paper were conducted in cooperation with the Alabama Agricultural Experiment Station.

NOTE.—This publication is of interest to farmers in the Southern States.

tuberculosis caused several deaths. Even when these two extremely unfavorable conditions are taken into consideration, the calves and steers were still produced at a profit. The authors state that—

When all the expenses, as deaths, rent on pasture, interest on money, etc., were charged against the animals and no credit was made for the manure, the expense of producing a steer varied from $4.96 to $5.25 per 100 pounds, as follows:

To 12 months of age, $5.25 per hundredweight.

To 24 months of age, $4.96 per hundredweight.

To 30 months of age, $5.05 per hundredweight.

To 33 months of age, $5 per hundredweight.

These figures mean that if the animals are sold for the above prices, the feeds used are marketed at a good farm price; all deaths are deducted; 7 per cent interest is received on the money invested in the animals; $2.50 an acre is secured as rent for the summer pasture, and finally the manure is secured free.

DETAILS OF THE EXPERIMENT.

As noted above, conditions surrounding the previous herd were not entirely satisfactory, as the animals were infested with ticks and affected with tuberculosis, consequently the test reported in this bulletin was undertaken with a herd which was free from tuberculosis and was rapidly being made free from cattle ticks, as every animal on the farm was dipped in an arsenical solution every two weeks. No ticks were seen on the calves during the progress of the test.

OBJECTS OF THE WORK.

The principal objects of the work were:

(1) To learn what it would cost to raise a beef calf to an age of approximately 9½ months under average farm conditions.

(2) To determine the profit, if any, in finishing these young calves for the market during the winter months, and selling them when about 12 months old.

THE CATTLE USED.

The animals used in this work were a herd of grade Aberdeen-Angus, a few grade Shorthorns, and four or five native cows, headed by two bulls, one of which was a purebred Aberdeen-Angus, while the other one was a high-grade Aberdeen-Angus.

The owner of the herd, Mr. E. F. Allison, of Sumter County, Ala., with whom the work was conducted, began several years previously the work of grading up scrub cows which had been bought from some of the neighboring farmers. Consequently, when the herd was entered in this experimental work it was under normal conditions and consisted of individuals considerably above the average of the State. As far as breeding and quality were concerned the Kernachan and Allison herds were very similar. The cows in both tests were small, those in the Sumter County experiment averaging only 630 pounds in weight February 9, 1911. However, at this time of the year they were poor and were in their lightest form. In the fall of the

year, before losing any of their normal summer weight, they averaged perhaps 800 pounds in weight. It will be seen later that these small cows raised calves which attained an average weight of 560 pounds by the time they were 12 months old. The Kernachan cows averaged about 830 pounds in weight at the end of the winter, but the calves from these larger cows were undersized, due largely, perhaps, to the presence of the cattle tick. As a result of the use of good bulls, the calves obtained from these grade cows were, as a rule, good ones. They were in the first place much larger than the average calves of the State, and in the second place measured up much more closely to the ideal beef conformation than calves obtained from native cows.

MANAGEMENT OF THE HERD.

The cows were bred so as to have the calves dropped during the spring months. During the summer months the animals, both young and old, grazed upon a moderately good pasture; no feed except salt was given in addition to the pasture. During these pasture months the cows ate nothing but pasture grasses while the calves had the cows' milk in addition to the grasses. The main pasture was made up principally of Japan clover and broom sedge, which had come naturally after the clearing of the land. This large pasture consisted of approximately 1,000 acres, but a very large part was covered with trees; under these trees the ground was bare. A small adjoining pasture of approximately 30 acres had been partly set to Bermuda, but this was used only occasionally for some calves. These permanent pastures afforded the animals reasonably good grazing for about six months of the year.

When the pastures became exhausted in the late fall the calves were weaned, the males castrated, and the cows and calves placed in separate fields and fed and managed differently. The cows were placed in the old corn and cotton fields, thus being fed the rough feeds of the farm along with small amounts of cottonseed cake. The calves were prepared for the winter fattening period. The following short statements give a brief history of the management of the cows and the lives of the calves from January 1, 1911, to April 1, 1912:

(1) The calves were born during the months of January, February, March, and April in 1911. The majority were born in March and April. At this time the cows were running in a field of 640 acres which had a small growth of cane; a part of this field consisted of old corn and cotton fields.

(2) The cows ate nothing except the cane and what roughage they secured from the old corn and cotton fields until January 23. By this time the rough field feeds had been pretty well consumed, consequently a small daily feed of cottonseed cake was introduced to supplement the range. The feeding of cottonseed cake was continued until April 14. On this date the cows and calves were all turned into the large

permanent pasture, and the ration of cottonseed cake was fed until May 7, as the season that year was exceedingly unfavorable for the early growth of pasture grasses.

(3) During the summer months the cows and calves ran together in the large pasture.

(4) The cows and calves were separated September 25. The calves were placed in a field containing old cornstalks, crab grass, and cowpeas. They remained in this field until October 7, when they were transferred to a field of peanuts which were to be subsequently grazed off by hogs. This peanut field afforded grazing until October 16 when they were returned to the corn and cowpea field. They were kept in this field until November 24, but were fed a small amount of cottonseed cake in addition, beginning with 1 pound of cake per calf per day on October 28 and gradually increasing the amount to 2 pounds. By November 24 the supply of feed in this field was exhausted, so the calves were transferred to a third field of cornstalks and crab grass, where they remained until the fattening period was inaugurated.

(5) By December 21 all of the available rough feeds of the farm had been consumed, and the calves were placed in a small barn lot and fattened for the early spring market. During this fattening period they were fed cottonseed meal, corn silage, and a cheap quality of broom-sedge hay.

(6) The calves were shipped to New Orleans and sold April 1, 1912.

(7) The bulls were allowed to run with the cows the year round. This, however, was found to be a poor practice, as the date of calving could not be regulated. When the bulls are with the cows continuously the first calves come too early in the season, and the last calves come too late. It is a much better practice to keep the bulls away from the herd of cows all the time except during the usual and proper breeding season.

PRICES AND CHARACTER OF FEEDS.

Cottonseed meal, cottonseed cake, pastures, corn silage, and broom-sedge hay were all used in the test. Cottonseed meal, corn-silage, and the hay were fed to the calves during the fattening period. The cows during the winter of 1911–12 were not given silage, as the supply was limited, but there is no doubt that both the cows and the calves would have done much better if the cows had been given a liberal quantity of this succulent feed. All of the feeds except the broom-sedge hay were of good quality. The cottonseed meal and cottonseed cake were fresh and bright. The corn silage was also of excellent quality; it was made of corn which would have yielded about 30 bushels of grain to the acre. While the hay was bright, clean, and well cured, it was of exceedingly poor quality, as broom sedge will not make a good quality of hay. It is, however, a roughage that should not be wasted.

In work of this character the financial statement is not as exact as might be desired, because the price of feeds, as well as of cattle, fluctuates considerably from year to year. The financial outcome of a particular experiment may not be duplicated by the cattle raiser or feeder, owing to the different conditions under which he is operating. The prices listed in this bulletin were the actual prices paid for the feeds (except corn silage and broom-sedge hay, which were made on the farm) and the actual prices realized for the cattle. This test was conducted during the winter of 1911–12; prices have not changed materially since that time. The following were the

FIG. 1.—SOME OF THE COWS OF THE BREEDING HERD. THEY WERE GRADE ABERDEEN-ANGUS, THOUGH PART OF THEM ALSO HAD SOME SHORTHORN BLOOD.

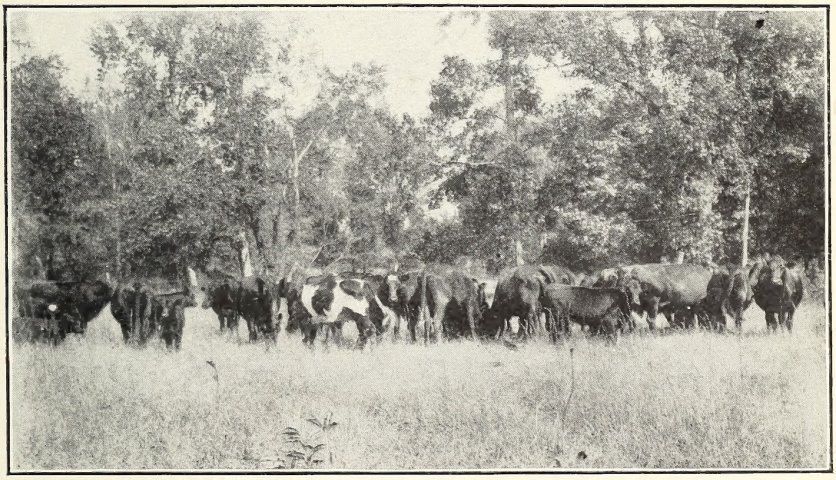

FIG. 2.—ANOTHER VIEW OF SOME OF THE CATTLE USED IN THE EXPERIMENT TO DETERMINE THE COST OF RAISING CALVES IN ALABAMA.

prices of the feeds, those of corn silage and hay being estimated: Cottonseed meal and cottonseed cake $26 a ton, corn silage $3 a ton, and broom-sedge hay $5 a ton.

METHOD OF CONDUCTING THE WORK.

The herd was kept and fed under average farm conditions. E. F. Allison, a farmer and stockman of Sumter County, Ala., agreed to cooperate, and the feeding was all done upon his farm. Mr. Allison furnished the cattle and the feed, while the work was planned and the feeding carried on under the supervision of the authors of this bulletin. E. R. Eudaly was stationed as assistant on the farm and had personal supervision of the experiment.

No barns or other artificial shelter were provided for the cows. During the winter months they were in fields where trees, together with the underbrush, afforded ample protection for mature animals. The calves, however, were provided with excellent shelter during the winter. While being fattened they were inclosed in a small lot in which was a good barn. The doors were always open so that they could go in and out at will. They were fed twice each day in troughs placed under the extending eaves of the barn. The calves were fed in such amounts that the feed was all eaten within a short time after it was put before them. An abundance of pure water and salt was provided all the time.

At the close of the test the calves which had been fattened were sold and shipped to New Orleans. The experimental farm was located 4 miles from Bellamy, Ala., the nearest railroad station, and the animals were driven to that point to be loaded on the cars.

THE EXPENSE OF RAISING THE CALVES TO WEANING TIME.

As previously stated, the majority of the calves were born in March and April. During the winter months the cows grazed the old corn and stalk fields and some "switch" cane which grew along the banks of a small stream. Beginning January 23, or immediately after the first cows dropped calves, the cows were given some cottonseed cake each day. As the grass was slow to establish itself in the spring of 1912 it was necessary to continue feeding the cows a small amount of cake until May 7. During the period from January 23 to May 7 the 80 cows consumed 6,390 pounds of cottonseed cake in addition to the feed they secured from the winter range and the early pastures. This was an average daily feed of a little less than 1 pound of cake for each cow, as they were fed for a period of 104 days. The cows were wintered in an unusually economical manner, and the farmer who lives on an average Alabama farm must expect to use more feed than was given to these cows, as the average farm at the present time has only a small acreage of old corn and cotton fields. It

was these fields which made it possible to get the cows through the winter in such a cheap manner.

The calves were not put in the fattening lot at the date of weaning, September 25. It had been planned to graze two or three fields by them before the finishing period arrived; consequently, as soon as they were taken from the cows, they were placed in a 50-acre field containing cornstalks, crab grass, and cowpeas. The peas had been planted at the last cultivation of the corn. The calves remained in this field until October 7, when they were transferred to a field of peanuts, which had been grown for hogs; they were taken to this field to graze off the tops of the peanuts. This small field afforded grazing for nine days, or until October 16, when the calves were taken back to the first field of old cornstalks and peas, where they were kept until November 24. This field did not, however, afford sufficient feed to produce gains, so on October 28 it was decided to add cottonseed cake. The cake was introduced at the rate of 1 pound per calf daily and gradually increased to 2 pounds. The 50-acre cornfield was so completely grazed by November 24 as to provide no further feed, so the calves were transferred to a second field of cornstalks, cowpeas, and crab grass, which had been saved for them. They remained in this second field, all the while eating 2 pounds of cottonseed cake per calf per day, until December 21, when they were taken to the barn, shut up in a small lot, and started on a preliminary ration of cottonseed meal, corn silage, and broom-sedge hay. By January 17 they were all accustomed to the new ration, and the fattening period was inaugurated. On this date they averaged approximately 9½ months of age. The following brief statement gives a short summary of the important facts of the cost of raising these calves to 9½ months of age:

Cost to raise calves to an age of 9½ months.

To 6,390 pounds of cottonseed cake eaten by the cows from Jan. 1, 1911, to Jan. 1, 1912, at $26 a ton	$83.07
To pasture rent for whole herd of 80 cows	250.00
To taxes on $2,380 invested in cattle	4.60
To interest on $2,380 invested in cattle, at 6 per cent	142.80
To 4,750 pounds of cottonseed cake fed calves in November and December	61.75
To 3,425 pounds of cottonseed meal fed calves Dec. 21 to Jan. 16	44.53
To 24,035 pounds of silage fed calves Dec. 21 to Jan. 16	36.05
To labor devoted to cattle during year	58.50
To 10 per cent depreciation in value of breeding cattle	238.00
Total cost of 64 calves to 9½ months of age	919.30
Average weight of each calf Jan. 16, 1912	pounds.. 460
Average cost of each calf	$14.36
Average cost per hundredweight	3.12

In studying the above financial statement the reader should understand that the cost of raising calves varies very materially from place

to place. They were raised to an age of 9½ months on this farm at a cost of $3.12 a hundredweight. On a second farm it may cost more, and on a third it may cost less. Each item noted above may not be duplicated upon another farm. The pasture rent, the taxes, the interest, the prices of feeds, and the cost of labor all vary in different localities.

When these calves had reached an approximate age of 9½ months they had attained an average weight of 460 pounds. While this is not a heavy weight, still it is much greater than that usually attained by native Alabama calves. In the experimental work carried on in cooperation with Mr. Kernachan, of Sheffield, Ala., the calves, at 12 months of age, had reached an average weight of only 402 pounds. Those calves, however, were infested with cattle ticks, which no doubt very materially impeded the rate of growth.

By the time the calves had reached an average age of 9½ months, each one had cost $14.36, or $3.12 per hundredweight. These figures include the cost of all the feeds which were given to both the cows and the calves, the rent on the pasture, the taxes, and interest on the money invested in the cattle, the labor required to care for and feed both the cows and the offspring, and 10 per cent depreciation in value of the breeding herd. The cattle were not credited with the manure produced, as there was no way to determine this factor accurately.

THE FATTENING PERIOD.

The calves were raised to the fattening period, at a cost of $14.36 each. On that date they had attained an average weight of 460 pounds, so it cost $3.12 a hundredweight to raise them. They were consequently entered in the fattening period at an initial cost of $3.12 per hundredweight.

There was a total of 64 calves in the herd, but all of them were not fattened for the market. The owner wished to build up the breeding herd, so 15 of the best heifers were kept on the farm. The remaining 49 calves were placed in the feed lot and given a ration of cottonseed meal, corn silage, and broom-sedge hay. The 15 heifers which were left on the farm were valued at $15 each. This figure is incorporated later in the financial statement as a credit to the increase in value of the herd.

The fattening period proper began January 17, 1912, although the calves had been on a ration of cottonseed meal, corn silage, and broom-sedge hay since December 21. A short time was necessarily required to get the animals accustomed to their new feeds. The cost of the feeds they ate during the preliminary period from December 21 to January 17 was charged against the cost of raising the calves, and not against the cost of fattening. At the beginning of the test

proper each calf was eating daily 3 pounds of cottonseed meal, approximately 20 pounds of corn silage, and 4 pounds of hay. The allowance of meal was raised gradually throughout the whole period of 76 days, until at the last each calf was eating 6 pounds daily. At one time each calf was consuming as much as 28 pounds of silage each day, but they would not continue to eat this much, so at the end of the period, April 1, they were eating an average of only 20 pounds per calf per day. The allowance of hay was gradually decreased from the first. At the middle of the period each calf consumed daily not over 3 pounds of hay, and near the end an exceedingly small allowance met their desires. From the middle of March to April 1 they averaged less than 1 pound of hay per calf per day.

The fattening period continued for a period of 76 days, or until April 1, when the 49 calves were sold and then shipped to New Orleans. They brought $5.87\frac{1}{2}$ a hundredweight on the farm.

The following gives a short summary of the most important results obtained during the fattening period:

The fattening period (Jan. 17–Apr. 1).

Number of calves in lot		49
Number of days fed		76
Average initial weight	pounds	456
Average final weight	do	560
Average total gain of each calf	do	104
Average daily gain	do	1.37
Average daily ration per calf:		
Cottonseed meal	do	4.4
Corn silage	do	23.9
Hay	do	2.76
Amount of feed required to produce 100 pounds of gain:		
Cottonseed meal	do	323
Corn silage	do	1,741
Hay	do	201
Cost to make 100 pounds of gain		$7.31
Profit on each calf as a result of fattening		8.88
Initial cost of calves per hundredweight		3.12
Selling price on the farm per hundredweight		$5.87\frac{1}{2}$

As previously stated, it cost $3.12 per hundredweight to raise these calves to an age of $9\frac{1}{2}$ months, and they were valued at this figure at the inauguration of the finishing period. At the end of the fattening period they sold for an average price of $\$5.87\frac{1}{2}$ per hundredweight on the farm and made a clear profit of $8.88 per calf.

The average weight of the calves at the beginning of the fattening period was 456 pounds. When sold, April 1, they had attained an average weight of 560 pounds and were approximately 1 year old. During this period they gained at an average daily rate of 1.37 pounds.

The only purchased feed used in the fattening period was cottonseed meal. The other two feeds, corn silage and broom-sedge hay, were made on the farm, the silage being valued at $3 a ton and the cheap hay at $5 a ton. Before a farmer spends $26 for a ton of cottonseed meal he should know whether or not he will get his money back in the shape of profit on the cattle. On this particular farm the two feeds, corn silage and hay, were produced at home, and the object was to find a profitable market for them. While the cottonseed meal cost $26 a ton, it was fed to the calves and sold, by means of them, for $78.64 a ton. The corn silage was valued at only $3 a ton, but it was sold by means of the calves for $12.74 a ton in this particular test. An abnormally high price was realized on the hay because only a small amount was used.

The authors do not claim that such favorable results can always be secured, but these results, taken together with those previously secured during the progress of the beef investigational work in Alabama, show that the farmer can usually well afford to buy certain commercial feeds for his animals, and it is usually to his advantage to feed the home-grown feeds to live stock rather than sell them on the market.

RAISING AND FATTENING PERIODS TAKEN TOGETHER.

The following gives a brief outline of the whole life of the calves; this comprises both the raising and the finishing periods, and includes a full statement of the total expense of both the cows and the calves:

Total summary.

Number of cows in herd	80
Number of breeding bulls in herd	2
Number of calves raised	64
To pasture rent for whole herd	$250.00
To taxes on $2,380 invested in herd	4.60
To interest at 6 per cent on $2,380 invested in herd	142.80
To 6,390 pounds of cottonseed cake fed to breeding cows during January, February, March, and April	83.07
To 4,750 pounds of cottonseed cake fed calves in November and December	61.75
To 3,425 pounds of cottonseed meal fed calves from Dec. 21 to Jan. 16	44.53
To 24,035 pounds of silage fed calves from Dec. 21 to Jan. 16	36.05
To 16,600 pounds of cottonseed meal fed calves from Jan. 17 to Apr. 1	215.80
To 89,545 pounds of corn silage fed calves from Jan. 17 to Apr. 1	134.32
To 10,377 pounds of broom-sedge hay fed calves from Jan. 17 to Apr. 1	25.94
To labor devoted to cattle during the year	58.50
To 10 per cent depreciation of the value of the breeding cattle	238.00
Total expenses of herd	1,295.36
Average cost of each calf when 1 year old	$20.24
Average weight of each calf when 1 year old ..... pounds	560

Average cost, per hundredweight, to raise and fatten calves	$3.61
Amount of money received for 49 fat calves	1,506.55
Value of 15 heifers left on farm for breeding	225.00
Total income of herd during 1911–12	1,731.55
Total profit on herd during 1911–12	436.19
Average profit on each calf (64 calves)	6.81
Average profit on each cow (80 cows)	5.45

The herd consisted of 80 cows, but only 64 calves were raised to an age of 1 year; this is, however, an excellent record. This is much better than the results reported on the Kernachan herd, when only 70.8 per cent and 72 per cent of the cows dropped calves during the springs of 1906 and 1907, respectively. The breeder can not expect every cow in the herd to drop a calf each year. It is important, however, that as many of the cows as possible produce calves each year; the idle cows are not only idle capital but they are constant consumers of farm products. The idle cow has a very important part to play in the total expense of raising a calf, as an expense of keeping her must be charged against the calves which other cows produce. To illustrate: The above table shows that a clear profit of $6.81 was made on each one of the 64 calves, but when the total number of cows was taken into consideration it is seen that a clear profit of only $5.45 was realized on each.

It cost $1,295.35 to care for and feed the whole herd during one year's time. This figure includes all possible expenses, as cost of labor, interest on investment, depreciation in the value of the herd, cost of pasture and all other feeds, and taxes. Forty-nine fat calves were sold for $1,506.55; 15 good heifer calves were kept on the farm for future breeding purposes, and they were valued at only $15 each. When the value of these 15 calves, $225, is added to the sum received for the fat calves, the total income of the herd is raised to $1,731.55. A total profit of $436.19 was consequently realized on the whole herd of 80 cows.

These results are, of course, entirely satisfactory, as they represent profits above the interest on the money invested, while the value of the manure made on the farm is not taken into consideration. The worth of the manure should never be neglected but there was no way to determine the exact amount produced and no approximation was made.

SUMMARY STATEMENTS.

(1) The objects of this test were, first, to learn what it would cost to raise beef calves to an age of approximately 9½ months, under average farm conditions, and, second, to determine the profit, if any, in finishing these young calves for the market during the winter months and selling them when about 12 months old.

(2) A herd of 80 cows, mostly grade Aberdeen-Angus, were employed. From this herd 64 calves were raised during the year 1911.

(3) The calves were born during the spring months and ran with their mothers on pasture until late fall, when they were weaned and prepared for the fattening period, which was inaugurated on January 17, 1912, and continued until April 1, 1912.

(4) In all, there were 64 calves, but only 49 of these were fattened for the market. The owner wished to build up the breeding herd, so 15 of the best heifers were kept on the farm for future breeding.

(5) When the calves were 9½ months old the 64 had attained an average weight of 460 pounds.

(6) It cost $14.36 to raise each calf to an age of 9½ months. This cost includes all possible expenses, or cost of all feed eaten by both cows and calves, interest on money invested in cattle, rent on pastures, taxes, depreciation on the value of the herd, etc. The average cost per hundredweight was $3.12.

(7) Forty-nine of the 64 calves were then placed in the feed lot. These 49 animals averaged 456 pounds in weight at the beginning of the fattening period and 560 pounds at the close. They, therefore, gained at the average daily rate of 1.37 pounds.

(8) Each calf, during the fattening period, ate daily 4.4 pounds of cottonseed meal, 23.9 pounds of corn silage, and 2.76 pounds of broom-sedge hay.

(9) To make 100 pounds of increase in live weight required the use of 323 pounds of cottonseed meal, 1,741 pounds of corn silage, and 201 pounds of hay, costing $7.31.

(10) When the calves were fat they were sold on the farm for $5.87½ a hundredweight. It cost only $3.61 per hundredweight to raise and fatten them.

(11) The total profit on the herd during 1911–12 was $436.19 or an average of $6.81 for each calf.

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